Alternative Source Term Workshop

Accident Dose Branch
Division of Risk Assessment
Office of Nuclear Reactor Regulation

AGENDA

8:30 - 8:40	Introduction and purpose - NRC
8:40 - 9:25	Discussion of RIS 2006-04 - NRC
9:25 - 10:25	Use of RADTRAD - Alion Science and Technology
10:25 - 10:40	Break
10:40 - 11:40	Experience with AST licensing process – Exelon
11:40 - 12:40	Lunch
12:40 - 1:40	Suggestions for revising RG 1.183 – All
1:40 - 3:40	Open forum – All
3:40 - 4:00	Concluding remarks - NRC

PURPOSE OF WORKSHOP

- Improve the AST review process:

1. Provide a forum for collectively sharing experience and lessons learned from the AST process
2. Discuss questions about RIS 2006-04
3. Seek feedback on RG 1.183 and suggestions for improvements

Accident Dose Branch

Margie Kotzalas (email: mxk5@nrc.gov, phone: 301-415-0566)

Mark Blumberg
Leta Brown
Donald Chung
Andrzej Drozd
Andrew Golden
Michelle Hart
Brad Harvey
Jack Hayes
Jay Lee
Josh McGuire
John Parillo
Rao Tammara

New members arriving soon:
LaRay Benton
Joe Hoch
Tasha Greene

NRC Branches Involved in AST

- Accident Dose Branch – lead
- Containment and Ventilation Branch – CRH, filters, containment integrity
- Steam Generator Tube Integrity and Chemical Engineering Branch – chemistry and pH control
- BWR/PWR Systems Branches – thermal hydraulics
- Nuclear Performance and Code Review Branch – fuel performance

Advance Questions - Themes

- Lack of **consistency**
- How **accurate** is accurate enough
- **Secondary containment** bypass leakage, drawdown/positive pressure period
- Identification of **staff positions**

More specific issues:
ESF flashing fraction
Aerosol deposition in piping
Elemental removal in piping
Applicability of 10 CFR 20 and GDC-19

RIS 2006-04

Issues

1. Level of detail contained in LARs
2. MSIV leakage and fission product deposition in piping
3. Control room habitability
4. Atmospheric Dispersion
5. Modeling of ESF leakage

RIS 2006-04

Issues (cont.)

6. Release pathways
7. Primary to secondary leakage
8. Elemental Iodine DF
9. Isotopes used in dose assessments
10. Definition of DE I-131

RIS 2006-04

Issues(cont.)

11. Acceptance criteria for off-gas or waste gas system release
12. Containment spray mixing

RIS 2006-04

- Level of detail contained in LAR submittals
  - Address all changes to licensing basis
  - Provide list of deviations from regulatory guidance and justification
  - Provide dose calculations
  - Provide computer input and output files
  - Identification of and relation to previous LARs

Example of High Quality Submittal

- Clear Communication in AST LARs
  - To evaluate plant-specific applicability, reflect understanding of underlying principles for methods used.
  - Issues may have been discovered since review of method previously approved, and would need to be discussed in LAR.   Look for:
    - RAIs for subsequent plants proposing to use referenced method
    - Information in RISs or other NRC generic communications
    - Discussion of issue in open literature, conference papers, etc.

Example of High Quality Submittal

- Clear Communication in AST LARs (cont.)
  - The LAR should reflect the information used in the engineering analysis and calculation, including basis (or justification, as needed) for each change to current licensing basis.
  - LAR should include justification for each proposed TS change.

Example of High Quality Submittal

- Examples of information tables

Current Licensing Basis vs. AST Design - LOCA		
Parameter	CLB Parameter	AST Parameter
Core Thermal Power Level	MWt	MWt
Activity Inventory in Core Ci/MWt		

Parameter	CLB Parameter	AST Parameter
Activity Release to Containment	Per R.G. 1.3	Per R.G. 1.183 Table 1 (Gap & Early In-Vessel Phases Only)
Release Timing	Instantaneous	Per R.G. 1.183 Table 4
Radioiodine Chemical Species	91% Elemental 5% Particulate 4% Organic	95% Elemental 4.85% Particulate 0.15% Organic
Primary Containment Volume	Drywell Free volume = ft3 Wetwell free volume = ft3 Total free volume = ft3	Drywell Free volume = ft3 Wetwell free volume = ft3 Total free volume = ft3
Primary Containment Cleanup (Natural Deposition)	None	Aerosol removal via natural Deposition (10th percentile Powers Model)

REGULATORY GUIDE 1.183 COMPARISON

Table A: Conformance with Regulatory Guide 1.183 Main Sections

RG Section	RG Position	Analysis	Comments
4.1.1	The dose calculations should determine the TEDE. TEDE is the sum of the committed effective dose equivalent (CEDE) from inhalation and the deep dose equivalent (DDE) from external exposure. The calculation of these two components of the TEDE should consider all radionuclides, including progeny from the decay of parent radionuclides that are significant with regard to dose consequences and the released radioactivity.	**Conforms**	TEDE is calculated, with significant progeny included.

REGULATORY GUIDE 1.183 COMPARISON

Table C: Conformance with Regulatory Guide 1.183 Appendix B (Fuel Handling Accident)

RG Section	RG Position	Analysis	Comments
1.2	The fission product release from the breached fuel is base on Regulatory Position 3.2 of this guide and the estimate of the number of fuel rods breached. All the gap activity in the damaged rods is assumed to be instantaneously released. Radionuclides that should be considered include xenons, kryptons, halogens, cesiums, and rubidiums.	**Exception taken (alternative treatment used)**	Since several fuel assemblies exceed the guidance outlined in Footnote 11, the gap release fractions are doubled for conservatism. This treatment (previously approved for Fort Calhoun is conservative as previously discussed in Table A of this Compliance Table (Item 3.2)

Questions?